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A dual cyclone separator **73** is employed wherein the cyclone inlet duct **86** splits the particulate entrained airflow and directs the two portions into the respective, adjacent cyclones.

As shown in FIG. **3** the inlet duct **62** of the cyclone separator **73** is scrolled so as to impart a predetermined centrifugal force to the particulate entrained air passing therethrough. The centrifugal force propels the particulate against the side walls **88** of the cyclone separator **73** which separates the majority of particulate from the airflow. This separated particulate falls to the bottom of the cyclone and accumulates thereat until removed for reuse, which can be by either manual or automated means. The remaining fine particulate, not separated out by the centrifugal force of the cyclone, is drawn upwardly through a central, baffled cyclone exhaust opening **90**. In conventional cyclone separator operation, the fine particulate exhausted through the cyclone exhaust opening **90** may be collected by a bag house or another cartridge filter cabinet.

In accordance with the present invention, the fine particulate from the cyclone separator is discharged into the cartridge cabinet **38** through a cyclone exhaust duct **92** in communication with a scrap cabinet bypass inlet duct **94**. The opening of the cyclone exhaust duct **92** and bypass inlet duct **94** are the same size so that an airtight seal can be effected between the two ducts when adjacent one another. Similarly, the bypass duct outlet **82** is proportioned to be the same size as the split cyclone inlet duct **86** such that the mating outer edges of the mating ducts form an airtight seal.

The cartridge cabinet **38** serves to filter out the fine particulate before the airflow is discharged into the plant. However, the large majority of air entrained particulate which is separated in the cyclone separators **73** is capable of reuse. Powder accumulated at the bottom of the cyclones **73** is transported manually or mechanically into a hopper or feeder **56** whereafter the powder is mixed with virgin powder and pumped back to the spray gun **32** for reuse. Thus, the air discharged from the exhaust fan **82** and exhaust filters is essentially free of paint spray except for a minute percentage of paint spray.

While the invention has been described with reference to a preferred embodiment, it will be understood to those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

What is claimed is:

**1.** A powder spray apparatus for spraying workpieces with particulate comprising:

- a spray booth having a floor, the spray booth receiving workpieces to be sprayed with powder, a portion of the powder being entrained in air in the spray booth, another portion of the powder settling on the floor; and
- a cyclone particulate separating system for separating spent powder from the air in which it is suspended, the cyclone particulate separating system comprising a cyclone inlet directing airflow having particulate entrained therein to a separator, the cyclone particulate separating system also having a sump positioned at the

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cyclone inlet for receiving particulate resting on the floor of the spray booth;

a return line connected to the sump for retrieving the particulate therein; and

a particulate hopper for holding particulate to be supplied to at least one spray gun, the particulate hopper being in communication with the sump to receive recovered particulate for reuse.

**2.** A powder spray apparatus for spraying workpieces with particulate according to claim **1** wherein the sump has at least one sloping wall for guiding powder to the return line.

**3.** A powder spray apparatus for spraying workpieces with particulate according to claim **1** wherein the sump is tapered.

**4.** A powder spray apparatus for spraying workpieces with particulate, comprising:

a spray booth for receiving workpieces to be sprayed with powder, a portion of the powder being entrained in air in the spray booth, the spray booth having a floor;

a particulate separating system for separating at least a portion of air-entrained powder from air, the particulate separating system having a sump positioned at a particulate separating system inlet for receiving particulate resting on the floor of the spray booth;

an air passageway for directing airflow from said spray booth to one of said particulate filter systems; and

an airflow control having a pair of baffles one of which is displaceable with respect to the other for controlling the rate of air flow through the spray booth to reduce overspray.

**5.** A powder spray apparatus according to claim **4** in which the air flow control is located near the air passageway.

**6.** A powder spray apparatus according to claim **4** in which the air flow control blocks a portion of the air flow entering the air passageway.

**7.** A powder spray apparatus according to claim **6** in which the baffles define a plurality of air flow openings.

**8.** A method for recovering overspray particulate from a floor of a spray booth of a powder spray apparatus, comprising:

applying low pressure to an exhaust of the spray booth; separating particulate from the exhaust;

moving particulate collected on the floor of the spray booth toward the exhaust opening;

capturing at least a portion of the particulate in a sump positioned at a particulate separator inlet; and

recycling the captured particulate to a particulate supply.

**9.** A method for recovering overspray particulate from a spray booth of a powder spray apparatus according to claim **8** in which the recycling further comprises transporting the particulate from the sump to the particulate supply.

**10.** A method for recovering overspray particulate from a spray booth of a powder spray apparatus according to claim **8** wherein the low pressure is below ambient pressure within the spray booth.

**11.** A method for recovering overspray particulate from a spray booth of a powder spray apparatus according to claim **8** wherein the particulate is manually transported to the exhaust opening for transport to the sump.

**12.** A method for recovering overspray particulate from a spray booth of a powder spray apparatus according to claim **8** wherein a portion of the particulate that becomes entrained in air in the booth during clean out is transported to a particulate separator for recovery of at least a portion thereof from the air.